

FACTORS ASSOCIATED WITH MATERNAL DEATHS IN UTTARAKHAND STATE

MAHENDRA KUMAR MAURYA¹, Dr. DIPAK KUMAR BOSE², & Dr. NEENA GUPTA³

¹PhD (Public Health) Scholar, SIHAS, SHUATS, Prayagraj, Uttar Pradesh, India

²Associate Professor, Department of Extension & Communication, SHUATS, Prayagraj, Uttar Pradesh, India

³Assistant Professor, Department of Public Health, SIHAS, SHUATS, Prayagraj, Uttar Pradesh, India

ABSTRACT

Maternal death mostly happens as a result of a host of medical factors which are often directly or indirectly affected by various socio-demographic, economic and cultural issues. Delays in decision making, arranging transport services and receiving requisite treatment at a health care facility independently or in combination contribute to maternal mortality in developing countries.

OBJECTIVE: *To find out medical and socio-cultural factors associated with maternal deaths.*

MATERIALS AND METHODS: *A cross sectional study was undertaken in four High Priority Districts of Uttarakhand State by conducting verbal autopsy of 178 maternal deaths. Household member preferably a close family member sharing the same kitchen was interviewed using pre-tested peer-evaluated questionnaire which captured information pertaining to verbal autopsy along with data on socioeconomic status and other socio demographic variables. Data analysis was done using Microsoft Excel. Results: Approximately one third (31.46%) of deceased women had received three or more ANC services. Almost half of the maternal deaths (47%) occurred at health facilities. The clinical causes reported are mainly Postpartum haemorrhage (42.17%), sepsis (7.23%), prolonged labour (7.23%) and Pregnancy-induced hypertension (6.02%). The study findings pertaining to socio cultural factors reveal that there are delays in decision making, reaching health care facilities on time and initiation of treatment. Most common socio cultural practices include serving food in relatively less quantity during the first trimester of pregnancy (40.45%), avoiding dark green leafy vegetables, pulses, grams during pregnancy (54.49%), discouraging pregnant women to drink much water (64.61%), placing the pregnant women in Gaushala (Cowshed) during and before three days of delivery (35.39 %) and serving strong sugary tea during labour (54.49%).*

CONCLUSION: *Quality ANC services along with nutrition based counseling need to be ensured for each pregnant women by doing rigorous follow up through RCH portal. Maternal deaths occurring at home and during transit can be managed only by timely identification of danger signs and prompt decision making for medical consultation. Maternal deaths reported in the postpartum period (up to 42 days) can be averted by ensuring proper post natal follow up through home-based newborn care visits by ASHA. Clinical management needs to be strengthened by ensuring facility readiness at Comprehensive Emergency Obstetric Care (CEmOC) and Basic Emergency Obstetric Care (BEmOC) facilities, competency of staff and availability of essential drugs, supplies and logistics. Sociocultural belief and wrong practices need to be addressed on priority by adopting multisectoral approach like empowering women, improving educational status, accessibility and affordability of health care services along with conducting extensive IEC and IPC activities by Front line Workers.*

KEYWORDS: *Maternal Death, Medical, Sociocultural Factors & Postpartum Haemorrhage*

Received: May 11, 2021; Accepted: Jun 01, 2021; Published: Jun 11, 2021; Paper Id.: IJMPSDEC20211

INTRODUCTION

Maternal death is no doubt a highly regrettable episode in most natural and otherwise pleasant stage of human biological and social life cycle. It has occurred since time immemorial and probably as old as birth itself. For many generations, it was thought to be natural and logical succession or just a coil of fortune.

Maternal mortality is considered a key indicator of population health, social and economic development (Zureick-Brown and Chou, 2012). Maternal mortality is not an ailment or a disease. Khan *et al.* (2006) reported that most of these maternal deaths can be prevented to a large extent if expectant mothers receive proper health care services during their whole pregnancy cycle from skilled health workers well-equipped with enough medical apparatus and logistics, and if they have access to timely emergency obstetric care. The complications that cause the death and disabilities of the mother also damage the infant they are carrying on or have given birth.

The indigenous beliefs and practices that form the cultural character are passed from one generation to the next generation. Shaikh and Hatcher (2005) reported that cultural aspects of pregnancy are often ignored whereas these practices are deeply implanted in the communities. Cultural practices usually become part of a person's lifestyle and it becomes arduous to transform their beliefs and conventional practices.

Khan & Pradhan (2013) found that maternal death occurs as a result of a host of medical factors which are often directly or indirectly triggered by various socio-demographic, economic and cultural issues. The intricate nature of maternal complications is often ignored due to insufficient and inappropriate information and understanding amongst communities and aggravated by many socio-cultural factors and practices. Many researchers have reported Haemorrhage as the major medical factor behind most maternal deaths in India. Other important common medical factors associated with maternal deaths are sepsis, post-abortion complications, and obstructed labour. Mills *et al.* (2007) noticed that delays in timely decision making, arranging transport services and receiving requisite treatment at a health care facility independently or in combination contribute to maternal mortality in developing countries.

The present study was conducted in four high priority districts of Uttarakhand State to identify various medical and socio-cultural factors that directly or indirectly lead to occurrence of maternal deaths.

OBJECTIVE

To determine medical and socio-cultural factors associated with maternal deaths.

MATERIAL & METHODS

- In order to commence this study, Maternal Death Information Report was taken from Medical Health & Family Welfare Department, Uttarakhand. The present cross sectional study was conducted over a period of two years by conducting verbal autopsy of 178 maternal deaths (excluding two accidental deaths as per the definition of maternal death).
- Within a year of occurrence of maternal death, the Researcher visited deceased family wherein household member (close family member sharing the same kitchen), who could provide maximum details regarding the events leading to maternal death, was interviewed using a pre-tested peer-evaluated questionnaire. The questionnaire largely covered information pertaining to verbal autopsy in addition to capturing data on the socioeconomic status of the head of the household and sociodemographic variables.

- Four High Priority Districts (HPDs) namely Tehri Garhwal, Pauri Garhwal, US Nagar and Haridwar district of Uttarakhand State were included in the present study. The information on medical causes of deaths was also cross verified from health care facility records in case of facility based maternal deaths before determining the actual cause of death. Assistance of local ASHA/ Anganwadi Worker and ANM was taken during interview with households.
- The findings of the study were tabulated in MS Excel sheet and analyzed further to draw a conclusion.

RESULTS

Around half of the deceased women (47.75%) belonged to lower middle class. Mean age of the deceased women was found to be 26 years. On average, the deceased experienced three pregnancies (Gravida) and the average parity was 2.7 (Para).

Table 1: Socioeconomic characteristics of head of the household

Socio-Economic Status as per Kuppaswamy Socioeconomic Scale, 2018	
Socioeconomic Class	Percentage (Number)
Upper (I)	0
Upper Middle (II)	37.64 (67)
Lower Middle (III)	47.75 (85)
Upper Lower (IV)	14.61 (26)
Lower (V)	0

Table 2: Sociodemographic characteristics of the deceased women

Characteristics	Statistics (Number)
Age (in Years): Average, SD	26, 4.6 (178)
Age (%)	
19-23 years	30.89 (55)
24-28 years	47.19 (84)
29-33 years	11.79 (21)
34-38 years	10.13 (18)
Reproductive History	
Pregnancies (mean)	3.1 (178)
Children ever born (mean)	2.7 (178)

Table 3: Reproductive Hhealth Care Received by the Deceased Women (n=178)

Characteristics	Percentage (Number)
Antenatal Care for the Index Pregnancy	
None	7.30 (13)
One	26.40 (47)
Two	30.90 (55)
Three or more	31.46 (56)
Don't know	3.93 (7)
Place of Delivery	
Institutional delivery	44 (79)
Place of Death	
At home	28.65 (51)
At Health facility	46.63 (83)
During Transit from Home to health facility	12.36 (22)
During Transit from one Health facility to another Health facility	12.36 (22)
Timing of Death	
During pregnancy	23.60 (42)

During delivery	28.65 (51)
During Abortion or within 6 weeks after the abortion	1.69 (3)
Within 42 days after delivery	46.06 (82)

Table 4: Medical Factors Associated with Facility based Maternal Deaths (n=83)

Cause of Death	Percentage (Number)
A. Direct Causes of Maternal Mortality	
Postpartum Haemorrhage (PPH)	42.17 (35)
Sepsis	7.23 (6)
Prolonged labour	7.23 (6)
Pregnancy-induced hypertension (PIH)	6.02 (5)
Antepartum Haemorrhage (APH)	2.41 (2)
Pulmonary Embolism	1.20 (1)
B. Indirect Causes of Maternal Mortality	
Cardiovascular conditions	12 (10)
Severe Anaemia	3.61 (3)
Jaundice	2.41 (2)
Acute renal failure	2.41 (2)
Blood infection	1.20 (1)
Vomiting blood	2.40 (2)
Chest infection	1.20 (1)
Cough & fever	1.20 (1)
Delay in caesarean section	1.20 (1)
Multiple organ failure	1.20 (1)
Pneumonia	1.20 (1)
Cancer	1.20 (1)
Hepatitis	1.20 (1)
Difficulty in breathing	1.20 (1)

Table 5: Sociocultural Factors (Three Delays) Associated with Maternal Death

Characteristics	Percentage (Number)
A. Delay in Decision making (Delay 1)	
A.1 Time taken in recognizing problems* (n=178)	
≤ 1 day	6.18 (11)
2-7 days	43.82 (78)
≥ 8 days	11.80 (21)
Never recognized	38.20 (68)
A.2 Decision to seek help in health care facility**	71.35 (127)
A.3 Time elapsed between realizing that there is a complication and seeking help* (n= 127)	
Within 1 day	31.50 (40)
2-3 days	37.00 (47)
≥ 4 days	31.50 (40)
B. Delay in Arranging Referral Transport (Delay 2)	
B.1 Time elapsed for arranging the transport*** (n=127)	
<1 hour	45.66 (58)
1-<2 hours	39.37 (50)
2-5 hours	14.96 (19)
B.2 Time elapsed to reach health care facility*** (n= 127)	
<1 hour	24.41 (31)
1-<2 hours	28.35 (36)
2-5 hours	47.24 (60)
C. Institutional Delay (Delay 3)	
C.1 Waiting time for health care provision*** (n=105)	
Immediately/ within 30 minutes	46.67 (49)

31-59 minutes	31.43 (33)
One – two hours	11.43 (12)
More than two hours	10.47 (11)
C.2 Number of facilities visited to seek treatment*** (n=105)	
One	79.05 (83)
Two	15.24 (16)
Three or more	5.71 (6)
* Cases who experienced any pregnancy complication	
** Cases who sought treatment for any pregnancy complication	
*** Among those deceased who sought care in any health care facility	

Table 6: Sociocultural Beliefs & Practices Reported in the Deceased Family (n=178)
Multi Response Table

Beliefs and Practices	Percentage (Number)
Serving plain buttermilk (Mattha) to pregnant women during the first trimester in order to prevent miscarriage/ spontaneous abortion.	51.12 (91)
Serving food in relatively less quantity during the first trimester of pregnancy so as to regulate weight of the growing baby and avoid complications/ probability of C-section during delivery	40.45 (72)
Avoid dark green leafy vegetables, pulses, grams during pregnancy for better digestion of food.	54.49 (97)
Discouraging pregnant women to drink much water so as to minimize pressure on the growing baby.	64.61 (115)
Engaging pregnant women in harvesting and manual threshing of paddy so as to avoid complication during the time of delivery	60.67 (108)
Reducing the frequency of diet intake during illness in pregnancy	33.15 (59)
Serving oily and spicy food to pregnant women during 2 nd trimester for good health and wellness.	45.50 (81)
Offering brew (Herbal Kaadha) to pregnant women to manage common sickness and constipation during pregnancy.	35.39 (63)
Applying mustard oil massage during third trimester to relieve abdominal pain and to manage high blood pressure.	32.02 (57)
Placing the pregnant women in Gaushala (Cowshed) during and before three days of delivery to prevent neonate from any sort of infection.	35.39 (63)
Serving strong sugary tea during labour so as to ease the delivery process	54.49 (97)
Calling Brahman to chant shlokas at the door of room where women is in labor for expediting delivery in case of delayed labour.	4.49 (8)

DISCUSSIONS

In the study population, 47.75 % head of household were of lower middle class and only 14.61 % were of upper lower class which clearly denotes the average socioeconomic status of most of the deceased families. Mean age of the deceased women was found to be 26 years. Three or more ANC services were received by only 31.46% deceased women. Institutional delivery was reported in case of 44 % deceased women. Almost half of maternal death (47%) occurred at a health facility. An equal percentage (12%) of maternal death was reported during transit from home to health facility and from one health care facility to another health care facility. Almost half of maternal deaths (46%) occurred in post partum period within 42 days after delivery. One related study conducted by Khan & Pradhan (2013) in Jharkhand State also reported 45% maternal deaths within six weeks after delivery, with the mean age of the deceased women to be 27 years.

Maternal death is chiefly attributed to a couple of medical factors which are often directly or indirectly influenced by many socioeconomic and cultural issues. The study endeavoured to capture medical factors associated with facility based maternal deaths. Most facility based maternal deaths (42.17%) occurred due to Postpartum haemorrhage (PPH) followed by sepsis (7.23%), prolonged labour (7.23%) and pregnancy induced hypertension (6.02%). Ramola M *et al.*

(2018) conducted an analysis of maternal deaths at a tertiary health care facility in Uttarakhand State wherein Haemorrhage (22.9%), eclampsia (14.6%) and sepsis (10.6%) were identified as the major direct causes of maternal death. Present findings on medical causes of maternal deaths are also consistent with studies conducted by Jain & Maharaje (2003), Pal *et al* (2005) and Jadhav AJ & Rote PG.(2007). Halim *et al* (2014) in a similar cross sectional study titled "Cause of and contributing factors to maternal deaths" reported the most common cause of death as haemorrhage (38%), followed by eclampsia (20%) and sepsis (8.1%).

Findings of Verbal autopsy were analysed to determine delays resulting in maternal deaths. Delay in decision-making about approaching a health facility after recognizing complications, delay in getting transport services and delay in receiving the actual treatment after reaching the health facility were identified as the main delay. Most of the elderly women of the deceased families (43.82%) took 2-7 days in recognizing problems. In 37% deceased families, 2-3 days time elapsed between realizing that there is a complication and seeking the appropriate treatment. In nearly half of the deceased cases (45.66%), less than an hour elapsed in arranging the transport services. Another 2-5 hours time elapsed to reach health care facility in almost half of the deceased cases (47.24%). Almost half of the deceased (46.67%) received health care services immediately or within half an hour after reaching the health care facility. Around one third families (31.43%) had to wait for around 31-59 minutes to receive emergency obstetric services after reaching the health care facility. Most of the deceased (79.05%) had to visit only one facility to receive the requisite health care services. However, 15.24 % families had to visit two health care facilities to get requisite health care services. One related study conducted by Khan & Pradhan (2013) reported that 47% of the women received treatment immediately or within 30 minutes after arrival at a health care facility; 28% were treated within 30-59 minutes, and the rest received treatment after a waiting time of more than an hour. However, almost one fourth (31.2 %) families had to visit two health care facilities to avail requisite health care services.

Sociocultural beliefs and practices also play a pivotal role in determining the good health of women in general. Negi SS *et al* reported that Uttarakhand has strong cultural and traditional practices existing for thousands of years. The present study also explored sociocultural belief and practices during pregnancy and delivery that affect the overall health of pregnant women including their survival. Some common sociocultural practices reported in the present study include serving food in relatively less quantity during first trimester of pregnancy so as to regulate weight of growing baby and avoid complications/ probability of C-section during delivery (40.45%), engaging pregnant women in harvesting and manual threshing of paddy so as to avoid complication during the time of delivery (60.67%), offering brew/ herbal kaadha to pregnant women to manage common sickness and constipation during pregnancy (35.39%), avoiding dark green leafy vegetables, pulses, grams during pregnancy for better digestion of food (54.49%), discouraging pregnant women to drink much water so as to minimize pressure on the growing baby (64.61%), reducing the frequency of diet intake during illness in pregnancy (33.15%), placing the pregnant women in Gaushala (Cowshed) during and before three days of delivery to prevent neonate from any sort of infection (35.39 %), serving strong sugary tea during labour so as to ease the delivery process (54.49%) and calling Brahman to chant shlokas at the door of room where women is in labor for expediting delivery in case of delayed labour (4.49%). A similar exploratory study on traditional sociocultural practices conducted by Saxena *et al* (2020) in Uttarakhand State reported that families believe that pregnant women should not consume green vegetables, yam, pulses, red grams, papayas, and mangoes (80%), pregnant women should also not eat full stomach as this can put pressure on the growing baby and baby would grow larger in size and it may result in difficulty at the time of delivery (75%), pregnant women should not be encouraged to drink much water because it would enter the side of the abdomen and lead to pressure on the baby (85%). Furthermore, mostly (90%) women delivered on the floor of the cowshed

usually covered with dried, long grass, and old sacks. There is a need to address some of these practices which are not scientifically proven to be beneficial for and evidence based.

CONCLUSIONS

“Medical and sociocultural factors associated with maternal death” concludes that most of the deceased families belonged to below average socioeconomic status which has adversely affected in availing proper ANC check ups, timely identification of danger signs and delay in decision making to take medical help. ANC services play a pivotal role in better pregnancy management and its outcome. ANC services along with nutrition based counseling need to be ensured for each pregnant women by doing rigorous follow up through RCH portal. Most of the elderly women of the deceased families took 2-7 days in recognizing problems. Identification of danger sign and timely medical consultation are vital for a better maternal and neonatal outcome as it also reduces the time that usually elapses in reaching health care facility. Maternal deaths occurring at home and during transit can be managed only by timely identification of danger signs and prompt decision making for medical consultation. Maternal deaths reported in post partum period (up to 42 days) can be averted by ensuring proper post natal follow up through home based newborn care visits by ASHA as per recommended protocol. Clinical management needs to be strengthened by ensuring facility readiness at Comprehensive Emergency Obstetric Care (CEmOC) and Basic Emergency Obstetric Care (BEmOC) facilities, competency of staff and availability of essential drugs, supplies and logistics. Sociocultural belief and wrong practices need to be addressed on priority by adopting multisectoral approach and intersectoral convergence like empowering women, improving educational status, accessibility and affordability of health care services along with conducting extensive IEC and IPC activities by Front line Workers.

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